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The Jelly Team: citizen science at a small community aquarium

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The Jelly Team: Citizen Science at a Small Community Aquarium

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Introduction to the MaST

The Highline Marine Science and Technology Center (MaST) is the marine biology and aquarium facility of Highline College in Des Moines, Washington, located on the south-central Puget Sound. Dedicated to expanding knowledge about Puget Sound, a central mission of the MaST Center is fostering a culture of marine stewardship by engaging the community through interactive learning, personal relations and exploration. The efforts and successes of a community volunteer group, 'The Jelly Team', exemplify citizen science achievement at the Mast.

After seven years, the MaST now has a self-sustaining aquaculture team and the public aquarium enjoys an ongoing supply of Moon Jellies *(Aurelia labiata)*. With the success of the Jelly Team, MaST staff work to maintain volunteer interest through the continued growth of the program. Many volunteers are actively encouraged to pursue other jelly-related interests through independent and cooperative projects.

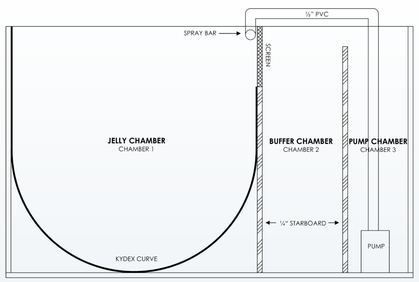


Figure 1. Blueprint of 20 gallon Pseudokreisel.

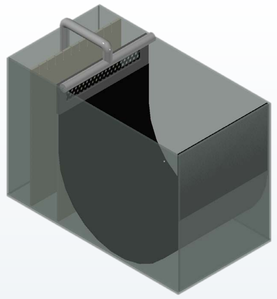


Figure 2. 3D Model of 20 gal Pseudokreisel.

Jellyfish Aquaculture

Jellyfish aquaculture is a highly labor intensive task requiring daily maintenance of rearing systems, culturing of live food, and water quality testing. At many large scale aquariums, a team of professionals is required to keep the jellyfish displays consistently full, ensuring a constant stock of healthy medusae. At the MaST center, thanks to efforts of dedicated volunteers, this daily care is conducted not by professionals, but rather a unique team of local citizen scientists.

Because jellyfish are planktivores, all aspects of their nutrition is grown in the lab in order to provide year round balanced nutrition for the fast growing medusae. Green microalgae is grown as food for a self-sustaining colony of rotifers, which is then fed to the jellies and supplemented with decapsulated, SELCO enriched brine shrimp.

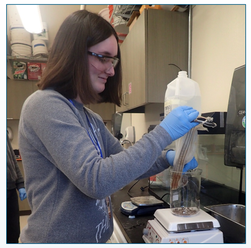
Their gelatinous bells which are over 95% water and pelagic environment require special tank design in order for the jellies to grow and maintain their lens shape. Kreisels have been used for many years by aquariums, however their construction can be costly. The jelly team has engineered their own pseudokreisels (Fig.1 & 2) from stock aquarium tanks, allowing the program to have multiple tanks of jellies in different stages running for the public in addition to their 84 gallon kreisel at any time.

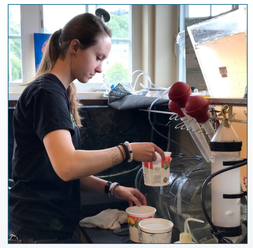
Recruiting & Training

A major setback the Jelly Team faced historically was not having enough volunteer involvement to expand the program. With better advertising within our aquarium, surrounding community, and local colleges and universities, we have increased volunteer recruitment and developed an internship program.

In order to train new volunteers and interns, we have prospective members job shadow current members, and are trained in the tasks associated with raising our jellyfish such as daily cleaning, maintenance, and feeding. Retention of volunteers is higher if they are relied upon for more leadership roles and feel like they hold stake in the program itself. By giving volunteers the responsibility of training new recruits, we ensure that training can be done without the need for staff involvement.

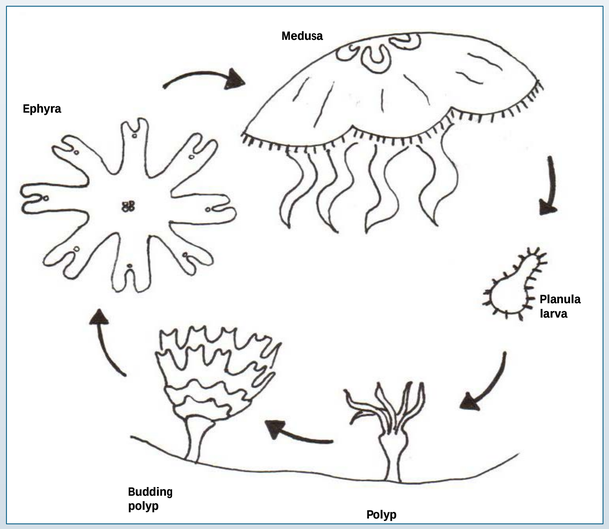
In order to provide a streamlined transfer of information, an online program was developed on Canvas and Google Classroom in order to provide training for new volunteers as well as expanding the knowledge of current members. This unification has minimized the passing on of improper practices as well as allowing new members to gradually gain the skills necessary to independently care for the jellies. These 12 narrated lessons include basic jellyfish biology, health and diseases of jellyfish, to advanced pseudokreisel and kreisel construction.





Jelly Team volunteers preforming daily chores such as food preparation (left), decapsulation of brine shrimp (center) and water changes (right).

Jellyfish Lifecycle



The jellyfish lifecycle (above) with examples of a moon jelly polyp (top), moon jelly ephyra (middle), and adult moon jelly medusa (bottom).

Current Status & Future of the Jelly Team

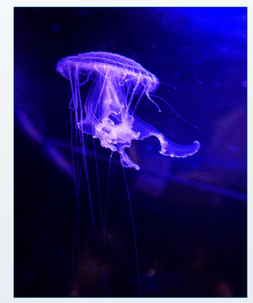
Three and six months internships are offered in which students can gain real world experience culturing jellyfish and conduct research that either 1) furthers our knowledge of jellyfish in Puget Sound, or 2) expands the Jellyfish Team in some way. Intern projects have included: copper toxicity in ephyrae, development of an intermediate classroom program, ctenophore husbandry, strobilation control, and nutrition.

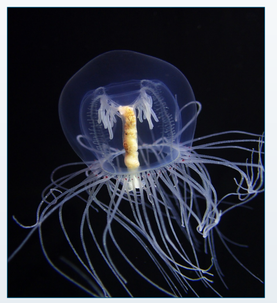
The Jelly Team is working toward continued success in non-staff driven training, adult moon jelly nutrition, artificial shocking of polyps to strobilate, online education of volunteers, and further experimentation with other gelatinous zooplankton.

Other Gelatinous Zooplankton

With the success of consistently raising 3,000 - 10,000 moon jellies in all life stages, the rearing of other local species is currently being explored and implemented. Local egg yolk jellies (*Phacellophora camtschatica*) were collected in October, 2016 and spawned in order to start a colony of polyps to expand the cnidarian variety for display, and further advance jelly team skills. Currently, efforts are being made to replace the kreisel with a larger, custom designed kreisel more adapt to supporting larger species such as egg yolk jellies.

Other local species the team has experimented with are hydromedusae, Red-eye Medusae (*Polyorchis pencillatus*), Cross Jellies (*Mitrocoma cellularia*), and Crystal jellies (*Aequorea victoria*). Each species was kept to see 1) how they would fair in our aquarium, 2) possible food sources, and 3) develop possible culture techniques for future use.





Egg Yolk Jellyfish grown at the MaST Center (left); Red-eyed Medusa on display at the MaST Center (middle); Crystal Jellyfish on display at the MaST Center (right).

References

Widmer, Chad. *How to Keep Jellyfish in Aquariums: An Introductory Guide to Maintaining Healthy Jellies.* Wheatmark, 2008

Acknowledgements

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